



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/053,237	04/01/1998	EARL COHEN	CIS-032-B	1056

24267 7590 12/03/2002

CESARI AND MCKENNA, LLP
88 BLACK FALCON AVENUE
BOSTON, MA 02210

EXAMINER

ELALLAM, AHMED

ART UNIT PAPER NUMBER

2662

DATE MAILED: 12/03/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/053,237

Applicant(s)

COHEN, EARL

Examiner

AHMED ELALLAM

Art Unit

2662

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 September 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,9,11,12,15-18,20,21,23,26,27,29-32 and 44-96 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 52,53,61-66,78 and 80-84 is/are allowed.
- 6) ☐ Claim(s) 1-3,9,11,12,17,18,20,21,23,26,27,29,31,32,44-52,54,57-60,67-77,79 and 85-96 is/are rejected.
- 7) ☒ Claim(s) 15,16, 30, 55, 56 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

This is responsive to the amendment filed on September 19, 2002. The amendment has been entered. Claims 1-3, 9, 11, 12, 15-18, 20, 21, 23, 26, 27, 29-32, 44-96 are pending.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 23, 32, 44, and 73 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Regarding claim 23, the specification does not adequately describe the feature of "distributing, in response to the hash function, the packet evenly among the plurality of processing engines". More specifically, the specification does not describe any step or process (such as involving counting of data packets at each processing engine) for the even distribution to take place.

Regarding claim 32, does the specification not adequately describe the feature of "a hashing function that causes the packets to be mostly evenly distributed among the processing engines". More specifically, the specification

Art Unit: 2662

does not describe any step or process (such as involving counting of data packets at each processing engine) for the mostly even distribution to happen.

Regarding claim 44, claim 44 is subjected to the same remarks as indicated in claims 23 and 33 above with reference to the feature of "determine an approximately even distribution of the packets to the route processing engine".

Regarding claim 73, is subjected to the same remarks with reference to the limitation "distributing the packets evenly among the plurality of processing engines" as indicated in claim 23.

2. The following is a quotation of the second paragraph of 35 U.S.C. 112: The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

Claims 86, 87, 88, 91, 92, 93 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: the routing processing.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

Art Unit: 2662

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors

Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claims 1, 2, 11, 17, 18, 20, 21, 26, 27, 29, 31, 45-51, 54, 57, 58, 59, 60, 67-69, 70-77, 79, 85, 89, 90, 94,95 and 96 are rejected under 35 U.S.C. 102(e) as being anticipated by Imai et al, US (6,175,874).

Regarding claim 1, with reference to Figures 1 and 14, Imai discloses a routing system for distributing packets in a network, the system comprising:

- a plurality of processing nodes, 3A, 3B, ... , 3N, and
- a relay device 1 that comprises a distribution control table 10, the distribution control table stores information for selecting processing nodes (processing engines) by hashing using some pattern relating to the transmission origin and destination of packets, see column 3, lines 45-62. Imai also discloses that the relay device (claimed switching means) distributes a received packet to a selected processing node from among nodes 3A-3N using the protocol type,

Art Unit: 2662

transmission origin address (source address), transmission origin port, and destination port, see column 4, lines 57-64.

Imai further discloses that packet of the same VC (virtual connection), the packet is delivered to the same processing node. Imai further discloses that the distribution control table (hash table) 10 stores information for selecting processing nodes by Hushing using some pattern relating to the transmission origin and destination of packets. The pattern matching unit 12 performs matching of patterns defined in the distribution control table 10 for received packets (claimed indicia). The Hash calculation unit 13 performs hash calculations using parameters determined by the defined pattern. The destination node extraction unit 14 selects a processing node, determined by the distribution control table 10, from the hash result of the hash calculation unit 13. see column 3, lines 44-59.

(Corresponding to a mechanism that performs a hashing function on at least a portion of network layer information in the packets transferred to the routing system, to produce an indicia of a flow and means for switching packets with a same indicia of a flow to a single route processing engine).

Imai discloses that the relay and processing nodes constitute a single cluster, see column 3, lines 42-43, (corresponding to the plurality of processing engines located within the router).

NOTE: the combination of the rely device all together with the processing nodes of Imai are regarded as the routing system of Applicant.

Art Unit: 2662

Regarding claim 2, with reference to Figure 16, Imai discloses an external network 4, Imai also discloses routing Internet traffic, see column 4, lines 30-35. (Corresponding to the routing system further comprising at least one fast uplink connection to an external network to accept outgoing packets from a plurality of processing engines).

Regarding claims 11, 17, claims 11, 17 have substantially the same claim limitation as in claim 1, thus it is subject to the same rejection.

Regarding claim 18, Imai discloses that the relay device distributes a received packet to a selected processing node from among nodes 3A-3N using the protocol type, transmission origin address (source address), transmission origin port, and destination port, see column 4, lines 57-64. (the network layer information comprises one or more of the following network information: a network source address of the at least one packet, a network destination address of at least one packet, a network destination address of at least one packet, a source port of at least one packet, and a protocol type value of the at least one packet).

Regarding claim 20, Imai discloses pattern matching and hashing. Therefore logically XORing an addresses, a port, and a protocol value is inherent to Imai because it is needed for pattern matching.

Regarding claim 21, with reference to Figure 2, Imai discloses a pattern table that stores information indicating the transfer address/port as arguments for the hash function, a node table 10N in combination with the pattern table, the node table is a hash table with processing nodes as an index of hash results.

Art Unit: 2662

See column 4, lines 6567 and column 5, lines 1-14. (Corresponding to providing a table containing entries for use in selecting the one processing engine; selecting one entry in the table specified by an index value, the index value being based upon the hash value to select the processing engine for the hash value; using the index value to direct the selection of the one processing engine for those packets that belong to the same packet flow).

Regarding claims 26, 27, 29, claim 26, 27, 29 have substantially the same claim limitations as in claims 18, 20, 21 respectively, thus they are subject to the same rejection.

Regarding claim 31, Imai discloses a relay device 1 that comprises a distribution control table 10, the distribution control table stores information for selecting processing nodes (processing engines) by hashing using some pattern relating to the transmission origin and destination of packets, see column 3, lines 45-62. Imai also discloses that the relay device distributes a received packet to a selected processing node from among nodes 3A-3N using the protocol type, transmission origin address (source address), transmission origin port, and destination port, see column 4, lines 57-64. Imai further discloses that packet of the same VC (virtual connection), the packet is delivered to the same processing node. (the means for selecting carries out a hashing function that preserves the packet flow).

Regarding claims 45-51, 54, 57, 58, 59, 67-69, 71-77, claims 45-51, 54, 57, 58, 59, 67-69, 71-77 have substantially the same or a combination the

Art Unit: 2662

limitations as in the rejected claims above, thus they are rejected for the same reasons.

Regarding claims 60, 79, Imai discloses high speed load dispersion is achieved using the address pattern of a cluster network request and continuous operation becomes possible even during a node failure due to maintenance, partial stoppage or the like. See column 12, lines 28-31. (Corresponding to allocating processing of packets to remaining processing engines in the event that a processor fails).

Regarding claim 70, claim 70 has substantially the same scope of claim 1, thus it is subject to the same rejection.

Regarding claim 85, with reference to Figures 1 and 14, Imai discloses a routing system for distributing packets in a network, the system comprising:

- a plurality of processing nodes, 3A, 3B, ... , 3N, and
- a relay device 1 that comprises a distribution control table 10, the distribution control table stores information for selecting processing nodes (processing engines) by hashing using some pattern relating to the transmission origin and destination of packets, see column 3, lines 45-62. Imai also discloses that the relay device (claimed switching means) distributes a received packet to a selected processing node from among nodes 3A-3N using the protocol type, transmission origin address (source address), transmission origin port, and destination port, see column 4, lines 57-64.

Imai also discloses that packet of the same VC (virtual connection), the packet is delivered to the same processing node. Imai further discloses that the

Art Unit: 2662

distribution control table (hash table) 10 stores information for selecting processing nodes by Hushing using some pattern relating to the transmission origin and destination of packets. The pattern matching unit 12 performs matching of patterns defined in the distribution control table 10 for received packets (claimed indicia). The Hash calculation unit 13 performs hash calculations using parameters determined by the defined pattern. The destination node extraction unit 14 selects a processing node, determined by the distribution control table 10, from the hash result of the hash calculation unit 13. see column 3, lines 44-59.

In addition, Imai discloses using the pattern matching and hash method, groups of processing nodes can be set according to the type of service, thereby dispersing the load. See column 6, 34-56. (Correspond to the claimed limitations of claim 85).

Imai further discloses that the relay and processing nodes constitute a single cluster, see column 3, lines 42-43, (corresponding to the plurality of processing engines located within the router).

Note: the combination of the rely device all together with the processing nodes of Imai are regarded as the router.

Regarding claim 90, claims 90 has substantially the same scope of rejected claims 85, thus it is subject to the same rejection.

Regarding claims 89 and 94, Imai discloses a relay device 1 that comprises a distribution control table 10, the distribution control table stores information for selecting processing nodes (processing engines) by hashing

Art Unit: 2662

using some pattern relating to the transmission origin and destination of packets, see column 3, lines 45-62. Imai also discloses that the relay device (claimed switching means) distributes a received packet to a selected processing node from among nodes 3A-3N using the protocol type, transmission origin address (source address), transmission origin port, and destination port, see column 4, lines 57-64. Corresponding to type of service is routing). Regarding claim 95, claim 95 is computer readable medium implementation of rejected claims 17, 71 and 91. Therefore claim 95 is rejected. Regarding claim 96, claim 96 is rejected for similar reasons as indicated in claim 95 above.

Claim Rejections - 35 USC 103

5. The following is a quotation of 35 U.S.C. 103(x) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Imai.

Regarding claim 9, with reference to Figures 1 and 14, Imai discloses a routing system for distributing packets in a network, the system comprising:

Art Unit: 2662

- a plurality of user terminals 5A, 5B,...,5M. (Corresponding to a plurality of network interfaces that transfer the packets to a destination and from a source); and
- a plurality of processing nodes, 3A, 313, ..., 3N, and
- a relay device 1 that comprises a distribution control table 10, the distribution control table stores information for selecting processing nodes (processing engines) by hashing using some pattern relating to the transmission origin and destination of packets, see column 3, lines 45-62. Imai also discloses that the relay device distributes a received packet to a selected processing node from among nodes 3A-3N using the protocol type, transmission origin address (source address), transmission origin port, and destination port, see column 4, lines 57-64. Imai further discloses that packet of the same VC (virtual connection), the packet is delivered to the same processing node. It is inherent to Imai's system to include a plurality of network interfaces, because they are needed for different components of the system to interface other entities such as interfaces between user terminals and the External network (See Figure 1).

Imai also discloses that the relay device interconnect the user terminals and the plurality of processing nodes.

Imai does not disclose that each plurality of network interfaces uses a hashing function to determine a distribution of packets among the plurality of processing nodes.

However, it would have been obvious to an ordinary person of skill in the art, at the time of the invention to have Imai hashing mechanism distributed and

Art Unit: 2662

carried out at network interface units so that distributed processing (hashing) can be implemented.

Regarding claim 9, Imai does not explicitly disclose that his routing system is scalable, however, it would have been obvious to a person of ordinary skill in the art, at the time of the invention, to render Imai's system scalable as suggested by Imai's system structure of distributed processing nodes.

6. Claims 3 and 12 are rejected under 35 U.S.C. 103(x) as being unpatentable over Imai in view of Varghese et al, US (5,905,723).

Regarding claims 3 and 12, Imai discloses substantially all the limitations of claim 3 and 12, except that Imai does not disclose that the relay device includes a crossbar.

However, with reference to Fig .1 and 2, Varghese discloses a scalable routing system for distributing packets in a network, comprising a crossbar switch interconnecting the network interfaces and the FE (forwarding engines).

Therefore, it would have been obvious to an ordinary person of skill in the art, at the time of the invention to have the relay device of Imai to include the crossbar switch of Varghese so that routing of data would be much faster.

Allowable Subject Matter

7. Claims 52, 53, 61-66, 78, and 80-84 are allowed.

Art Unit: 2662

Claim 15, 16, 30, 55 and 56 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

8. Applicant's arguments with respect to claims 1-3, 9, 11, 12, 17, 18, 20, 21, 23, 26, 27, 29-32, 44-54, and 57-96 have been considered but they are not persuasive.

Applicants did not respond to the 112 2nd paragraph rejection.

112 1st rejection:

Applicants argued that the specification does adequately disclose the features in claims 23, 32, 44 and 73 by pointing out to the statements in the specification.

The passages Applicants relied upon states:

At page 7, lines 5-13 "The present invention provides a router architecture capable of implementing a wide variety of services while balancing the router system load among a number of processors. The router architecture of the present invention is also capable of distributing the load from a single uplink among the multiple processors. The ability to distribute the router system load among all of the processors in the system makes the system through-put scalable; the throughput rate increases with each additional processor. Because there is no cooperation problem among the processors and each is acting independently and preferably on separate flows, the system throughput is expected to scale approximately linearly with the number of processors." and at page 17 line 20 – page 18 line 2: "Other alternative embodiments include performing some services of a bounded nature on the DCs, as is currently done with output queuing. For example, the DCs could accumulate

Art Unit: 2662

statistics and do flow-based accounting on each packet. In this way, the DCs could handle some portion of the known processing load leaving unbounded and future services to the RPEs."

Examiner respectfully disagree with Applicants, that such passages provided adequate description of the claimed features of "distributing, in response to the hash function, the packet evenly among the plurality of processing engines", "a hashing function that causes the packets to be mostly evenly distributed among the processing engines", "determine an approximately even distribution of the packets to the route processing engine". More specifically, when the specification is taken as a whole it is not clear how such feature of even distribution is carried out when there is a need of specialized processing in accordance with the type of service for example, there no technical description of the features claimed. Examiner notes that It is clear from the passages above that many details are needed for an adequate description of the claimed features and that the passages relied upon are a kind of summary rather than adequate description under 112 1st rejection.

Art rejection:

Applicants argued that Imai does not disclose the feature of "plurality of processing engines located within the router" as added in claims 1, 11, 17, 26, 45, 70, 85 and 90. Examiner respectfully notes that it was already indicated in the previous office action that the relay and processing nodes constitute a single cluster, see column 3, lines 42-43. More importantly, the single cluster does read on Applicant router, because it reads on every limitation as in Applicant, given

Art Unit: 2662

each limitation its broadest interpretation. Therefore, the argument of a single box device is not persuasive given the concept of "single cluster" which can be regarded as an integral part of Applicants router components. See *In re Lindberg*, 93 USPQ 23 (CCPA 1952). Examiner, respectfully notes that given the argument of the "single cluster", Imai does disclose the limitations of Applicant router, since the relay and processing nodes belongs to the single cluster. Thus similar rejection as in the previous office action is indicated above.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to AHMED ELALLAM whose telephone number is (703) 308-6069. The examiner can normally be reached on 9-5:30.

Art Unit: 2662

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kizou Hassan can be reached on (703) 305-4744. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

AHMED ELALLAM
Examiner
Art Unit 2662
December 2, 2002



HASSAN KIZOU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600